

Anvil Semiconductors has developed a unique proprietary technology which, by growing thin layers of silicon carbide SiC on silicon wafers, rather than using expensive bulk SiC, enables wafer costs to be reduced by a factor of 20 and promises to deliver the advantages of SiC devices for the cost of conventional silicon ones. The proprietary process overcomes the critical problems of mismatches in lattice parameter and thermal coefficient of expansion between the two materials and can be readily migrated onto 150mm diameter wafers – and potentially beyond.

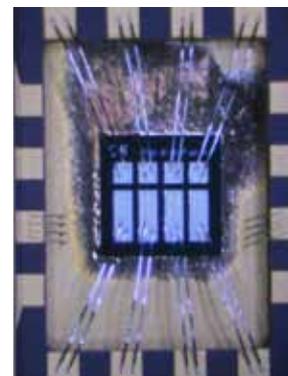
Another area of cost saving compared to conventional SiC technology comes from the processing of the active device. The cubic form of SiC (3C-SiC) grown on silicon is much easier to process than the hexagonal form of the material (4H-SiC) which is produced in bulk crystals. Indeed 3C-SiC can be processed in a conventional silicon CMOS line with the addition of one high temperature furnace.

Anvil is using third party facilities to produce production, device quality 3C-SiC on 100mm diameter silicon wafers with layer thicknesses that permit the fabrication of vertical 1200V power devices. These are being used to develop vertical 650V and 1200V Schottky Barrier Diodes (SBDs) and MOSFETs in 3C-SiC capable of current densities of at least 500A/cm². The SBDs produced to date show ideal characteristics, no silicon/SiC interface effects and excellent yields.



Anvil Semiconductors has offices in Coventry and Cambridge and has a small experienced team and an extensive network of Industrial and Academic partners to develop unique silicon carbide power device. SiC offers many superior properties over silicon:

- SiC can sustain higher voltages reducing system complexity and cost whilst improving system reliability.
- SiC can carry higher currents with lower parasitic capacitances.
- SiC has a higher thermal conductivity and can operate at temperatures up to 400 °C (cf silicon 150 °C) reducing the cooling costs and complexity of applications such as hybrid vehicles.
- SiC is able to switch ten times faster allowing the use of smaller capacitors and inductors producing cheaper, smaller and more efficient systems.



Advantages of Silicon Carbide